

Amendments to the Claims:

The listing of claims will replace all prior version, and listings, of claims in the application:

Listing of Claims:

Claims 1 – 20 (cancelled)

Claim 21 (currently amended): A composition for detection of energy radiation comprising:
a cerium doped lutetium yttrium orthosilicate mono crystal.

Claim 22 (currently amended): The composition of claim 21, wherein the crystal includes: a ~~monocrystalline~~ monocrystalline structure of cerium doped lutetium yttrium orthosilicate, $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$ where $x =$ approximately 0.00001 to approximately 0.05 and $y =$ approximately 0.0001 to approximately 0.9999.

Claim 23 (previously presented): The composition of claim 22 wherein x ranges from approximately 0.0001 to approximately 0.001 and y ranges from approximately 0.3 to approximately 0.8.

Claim 24 (currently amended): A method of making a scintillation crystal comprising the steps of:

- (a) mixing Lu_2O_3 , Y_2O_3 , SiO_3 , CeO_2 , SiO_2 together to form a mixture;
- (b) heating the mixture;
- (c) interacting the heated mixture with an LSO seed crystal; and
- (d) growing an LYSO crystal from the interaction.

Claim 25 (previously presented): The method of claim 24 wherein Lu_2O_3 is substantially pure.

Claim 26 (previously presented): The method of claim 24 wherein Y_2O_3 is substantially pure.

Claim 27 (previously presented): The method of claim 24 wherein SiO_2 is substantially pure.

Claim 28 (previously presented): The method of claim 24, wherein the heating step includes: heating the mixture to a molten state.

Claim 29 (currently amended): The method of claim 24, wherein the growing step includes: separating said LYSO crystal from the melt and cooling ~~the seed~~ said LYSO crystal.

Claim 30 (previously presented): A crystal scintillator comprising a transparent single crystal of cerium-activated lutetium yttrium oxyorthosilicate having the general formula $\text{Lu}_{(2-x-z)}\text{Y}_x\text{Ce}_z\text{SiO}_5$, wherein $0.05 \leq x \leq 1.95$ and $0.001 \leq z \leq 0.02$.

Claim 31 (previously presented): The crystal scintillator of claim 30, wherein $0.2 \leq x \leq 1.8$.

Claim 32 (previously presented): The crystal scintillator of claim 31, wherein said scintillator has a luminescence wavelength of about 420 nm.

Claim 33 (previously presented): The crystal scintillator of claim 32, wherein said scintillator has a luminescence decay time of about 35-45 ns.

Claim 34 (previously presented): A scintillation detector, comprising:

- (a) A crystal scintillator comprising a transparent single crystal of cerium-activated lutetium yttrium oxyorthosilicate having the general formula $\text{Lu}_{(2-x-z)}\text{Y}_x\text{Ce}_z\text{SiO}_5$, wherein $0.05 \leq x \leq 1.95$ and $0.001 \leq z \leq 0.02$; and
- (b) A photodetector optically coupled to said crystal scintillator for detecting light from said crystal scintillator.

Claim 35 (previously presented): The detector of claim 34, wherein said photodetector comprises a photomultiplier tube.

Claim 36 (previously presented): The detector of claim 34, wherein said photodetector comprises a charge-coupled device.

Claim 37 (previously presented): A scintillation detector, comprising:

- (a) a crystal scintillator comprising a transparent single crystal of cerium-activated lutetium yttrium oxyorthosilicate having the general formula $\text{Lu}_{(2-x-z)}\text{Y}_x\text{Ce}_z\text{SiO}_5$, wherein $0.2 \leq x \leq 1.8$ and $0.001 \leq z \leq 0.02$; and
- (b) a photodetector optically coupled to said crystal scintillator for detecting light from said crystal scintillator.

Claim 38 (previously presented): The detector of claim 37, wherein said photodetector comprises a photomultiplier tube.

Claim 39 (previously presented): The detector of claim 37, wherein said photodetector comprises a charge-coupled device.

Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 2. This sheet replaces the original sheet Fig. 2. The typographical error has been corrected.

The attached sheet of drawings includes changes to Fig. 3. This sheet replaces the original sheet filed with the divisional application. The correct informal version of Fig. 3 originally filed with the divisional application correctly corresponds with the parent application 09/506,150 and which subsequently issued as U.S. Patent 6,624,420. A different formal Fig.3 was inadvertently included with the filing of the divisional application and was inserted in error. The replacement sheet is a copy of the formal Fig. 3 of record in the parent application.

Attachment: Replacement Sheets
 Annotated Sheet Showing Changes